



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,930	09/19/2003	Warren M. Farnworth	2269-5529US (02-0766.00/U)	6453
24247 TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110	7590 02/25/2009			
EXAMINER				
ISAAC, STANETTA D				
ART UNIT		PAPER NUMBER		
2812				
NOTIFICATION DATE		DELIVERY MODE		
02/25/2009		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USPTOMail@traskbritt.com

Office Action Summary

Application No.

10/666,930

Applicant(s)

FARNWORTH ET AL.

Examiner

STANETTA D. ISAAC

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 November 2008.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 25-39 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-4 and 25-39 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 19 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/US)
Paper No(s)/Mail Date 1/13/09, 11/03/08 & 8/15/08
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

This Office Action is in response to the amendment filed on 11/03/08. Currently, claims 1-14 and 25-39, are pending.

Information Disclosure Statement

1. The information disclosure statements (IDS) were submitted on 8/15/08, 11/03/08 and 1/13/09 was filed after the mailing date of the Office Action on 8/06/08. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-7, 11-14 and 29-34 are rejected under 35 U.S.C. 102(e) as being anticipated by Tandy et al (US Patent Application Publication, US 2003/0003688 A1, hereinafter referred to as “Tandy”).

Tandy discloses the semiconductor method as claimed. See figures 1A-6, and corresponding text, where Tandy teaches, pertaining to claim 1, a method for supporting wafers for singulation and pick-and-place, comprising: providing a semiconductor wafer **10** (figure 1A;

[0028]); mounting an adhesive-coated tape **1/2** to a surface of the semiconductor wafer (figure 4A; [0034] and [0039], specific adhesive material); gripping the semiconductor wafer along at least a portion of a continuous peripheral ring of material comprising at least in part semiconductor material thereof (figure 4A; [0034]), *Note*: the Examiner takes the position that, the marking tape, as taught by Tandy, is bonded to the backside of the semiconductor wafer by an adhesive material, thus, gripping the semiconductor wafer including the periphery at the outer edge portions of the wafer is anticipated); singulating individual components **20** from the semiconductor wafer, leaving at least the at least the portion of the continuous peripheral ring of material comprising at least in part semiconductor material (portions between the backside surface **24** and outer edge of the wafer **10**) along a periphery thereof (figure 1A; [0028]); and removing at least some of the individual components **20** from the adhesive-coated tape (figures 4A and 4B; [0034-0035]).

Tandy teaches, pertaining to claim 2, wherein gripping the semiconductor wafer along at least a portion of the continuous peripheral ring of material further includes gripping the semiconductor wafer by the ring of material during the removing of the at least some individual components (figures 4A and 4B; [0034-0035]).

Tandy teaches, pertaining to claim 3, further including forming the ring of material only from the material of the semiconductor wafer (figure 1A; [0028]).

Tandy teaches, pertaining to claim 4, further including forming at least a portion of the ring of material from a polymer material **2** disposed about and contiguous with a periphery of the semiconductor wafer and of thickness at least as great as a thickness of the semiconductor wafer (figure 4A; [0039], *Note*: the Examiner takes the position that the adhesive layer, as taught by

Tandy, includes a polymer material attached directly to the backside of the semiconductor wafer including the periphery of the wafer).

Tandy teaches, pertaining to claim 5, further including forming the ring of material in part from the material of the semiconductor wafer and in part from a polymer disposed about and contiguous with a periphery of the semiconductor wafer and of thickness at least as great as a thickness of the semiconductor wafer (figure 4A; [0039]).

Tandy teaches, pertaining to claim 6, further comprising the ring of material from the polymer material by one of spin-coating, stereolithography or molding ([0039]).

Tandy teaches, pertaining to claim 7, further comprising backgrinding the semiconductor wafer prior to singulating (figure 1B; [0028]).

Tandy teaches, pertaining to claim 11, wherein mounting the adhesive-coated tape comprises mounting a tape bearing a UV-sensitive adhesive thereon ([0033]).

Tandy teaches, pertaining to claim 12, further comprising exposing the UV-sensitive adhesive prior to removing the at least some individual components, while leaving a portion on the adhesive-coated tape extending over the ring of material unexposed ([0035-0036]).

Tandy teaches, pertaining to claim 13, wherein the semiconductor wafer is singulated using one of laser cutting, water cutting and sawing (figure 1A; [0028]).

Tandy teaches, pertaining 14, further comprising discarding the ring of material, any remaining individual components and the adhesive-coated tape after removing the at least some individual components ([0051], *Note*: the Examiner takes the position since Tandy teaches, the use of conventional semiconductor die testing procedures used to determine good dies,

discarding of materials including adhesive coated tapes and any remaining individual components are anticipated).

Tandy teaches, pertaining to claim 29, a method of processing a semiconductor wafer, comprising: gripping a semiconductor wafer along at least a portion of a continuous peripheral ring of material comprising at least in part semiconductor material (figure 4A; [0034]), *Note:* the Examiner takes the position that, the marking tape, as taught by Tandy, is bonded to the backside of the semiconductor wafer by an adhesive material, thus, gripping the semiconductor wafer including the periphery at the outer edge portions of the wafer is anticipated); and singulating individual components from the semiconductor wafer while leaving at least the at least the portion of the continuous peripheral ring of material uncut (figure 1A; [0028], portions between the backside surface **24** and outer edge of the wafer **10**).

Tandy teaches, pertaining to claim 30, further including removing at least some singulated individual components therefrom (figures 4A and 4B; [0034-0035]).

Tandy teaches, pertaining to claim 31, wherein gripping a semiconductor wafer along at least a portion of a continuous peripheral ring of material further includes gripping the uncut peripheral ring of material while removing the at least some singulated individual components therefrom (figures 4A and 4B; [0034-0035]).

Tandy teaches, pertaining to claim 32, further comprising defining the uncut peripheral ring of material from semiconductor material (figure 1A; [0028]).

Tandy teaches, pertaining to claim 33, further comprising defining the uncut peripheral ring of material at least in part polymer disposed about and contiguous with the semiconductor wafer (figure 4A; [0039], *Note:* the Examiner takes the position that the adhesive

layer, as taught by Tandy, includes a polymer material attached directly to the backside of the semiconductor wafer including the periphery of the wafer).

Tandy teaches, pertaining to claim 34, further comprising defining the uncut peripheral ring of material in part from semiconductor material and in part from a polymer disposed about and contiguous with a periphery of the semiconductor wafer (figure 4A:[0039]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tandy et al (US Patent Application Publication, US 2003/0003688 A1, hereinafter referred to as "Tandy") as applied to claim 1 above, and further in view of Usami et al (US Patent 6,589,818, hereinafter referred to as "Usami").

5. Tandy discloses the semiconductor method substantially as claimed. See rejection above. In addition, Tandy teaches, pertaining to claims 9 and 10, further comprising mounting the adhesive-coated tape to a backside of the semiconductor wafer and singulating the semiconductor wafer from an active surface thereof (figure 4A; [0034]).
6. However, Tandy fails to show, pertaining to claim 8, further comprising singulating the semiconductor wafer from a backside thereof after backgrinding.
7. Usami teaches separating the chips by pushing upwardly from the back side of the semiconductor wafer and attaching the separated chips to a substrate using an adhesive material that is thermally bonded to the substrate by a heating head (figure 1; col. 3, lines 45-50). The advantage to performing this process is that separating the chips can be done without involving any undesirable damage to the semiconductor devices (col. 3, lines 1-5).
8. Therefore, it would have been obvious to one of ordinary skill in the art to substitute singulating the semiconductor wafer from the backside thereof after backgrinding, in the method of Tandy, pertaining to claim 8, according to the teachings of Usami, with the motivations that by separating the semiconductor chips from the backside of the semiconductor wafer would eliminate damage to the chips resulting in a more efficient singulating process.

Claim 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tandy et al (US Patent Application Publication, US 2003/0003688 A1, hereinafter referred to as "Tandy") as applied to claim 1 above, and further in view of Kurosawa (US Patent 7,140,951, hereinafter referred to as "Kurosawa").

9. Tandy discloses the semiconductor method substantially as claimed. See figures 1A-6, and corresponding text, where Tandy shows, pertaining to claim 25, a method for processing a semiconductor wafer, comprising: mounting an adhesive-coated tape $1/2$ to a surface of a semiconductor wafer **10** (figure 1A; [0028]); and singulating individual components **20** from the semiconductor wafer, leaving an uncut ring of material (portions between the backside surface and outer edge of the wafer **10**) comprising at least in part semiconductor material along a periphery of the semiconductor wafer (figure 1A; [0028]) and removing at least some singulated individual components while the adhesive-coated tape is mounted to the surface thereof (figures 4A and 4B; [0034-0035]).
10. However, Tandy fails to show, pertaining to claim 25, without using a film frame.
11. Kurosawa teaches, pertaining to claim 25, singulating individual components from the semiconductor wafer and removing at least some of the singulated individual components without using a film frame (figures 20A and 23-25; col. 9, lines 50-61; and col. 10 lines 18-32).
12. Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the following steps of: singulating individual components from the semiconductor wafer and removing at least some of the singulated individual components without using a film from, in the method of Tandy, pertaining to claim 25 according to the teachings of Kurosawa, with the motivation that of eliminating of die chipping cracking and/or scratching is obtained, thus improving the quality of the semiconductor die and increasing the manufacturing yield (col. 13, lines 17-38).

Claims 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tandy et al (US Patent Application Publication, US 2003/0003688 A1, hereinafter referred to as "Tandy") and further in view of Kurosawa (US Patent 7,140,951, hereinafter referred to as "Kurosawa") as applied to claim 25 above, and further in view of Oka (US Patent 6,551,906, hereinafter referred to as "Oka").

Tandy in view Kurosawa discloses the semiconductor method substantially as claimed. See above rejection.

However, Tandy in view of Kurosawa fails to show, pertaining to claim 26, wherein the semiconductor wafer is a 300 mm semiconductor wafer and further including handling the 300 mm semiconductor wafer using equipment sized to handle 200 mm semiconductor wafers. In addition, Kurosawa fails to show, pertaining to claim 27 further including singulating the 300 mm semiconductor wafer using a 200 mm semiconductor wafer saw chuck. Also, Kurosawa fails to show, pertaining to claim 28, further including holding the 300 mm semiconductor wafer in a 200 mm semiconductor wafer pick-and-place machine chuck while removing the at least some singulated individual components therefrom.

Oka teaches, in figures 1A-7H, and corresponding text, a similar method where conventionally the semiconductor wafers are grinded to a desired thickness of 300 mm prior to singulation (col. 1, lines 19-66; col. 2, lines 9-15).

It would have been obvious to one of ordinary skill in the art to incorporate the following steps: wherein the semiconductor wafer is a 300 mm semiconductor wafer and further including handling the 300 mm semiconductor wafer using equipment sized to handle 200 mm semiconductor wafers; further including singulating the 300 mm semiconductor wafer using a

200 mm semiconductor wafer saw chuck; further including holding the 300 mm semiconductor wafer in a 200 mm semiconductor wafer pick-and-place machine chuck while removing the at least some singulated individual components therefrom, in the method of Tandy in view of Kurosawa, pertaining to claims 26-28, according to the teachings of Oka, with the motivation of conventionally preparing the semiconductor wafer for further packaging processing techniques such as chip formation. In addition, since the semiconductor wafer size is 300 mm the advantage would be greater production in the number of chips produced, resulting in an improvement of throughput chip manufacturing. Finally, since Oka teaches, that the semiconductor wafers are conventionally formed at a size of 300 mm, having equipment to accommodate handling a wafer of this size is obviously well known in the art of semiconductor manufacturing.

Claims 35-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tandy et al (US Patent Application Publication, US 2003/0003688 A1, hereinafter referred to as "Tandy") as applied to claim 29 above, and further in view of Oka (US Patent 6,551,906, hereinafter referred to as "Oka").

13. Tandy discloses the semiconductor method substantially as claimed. See above rejection.

However, Tandy fails to show, pertaining to claim 35, further comprising selecting a 300 mm semiconductor wafer and handling the 300 mm semiconductor wafer using equipment sized to handle 200 mm semiconductor wafers. In addition, Tandy fails to show, pertaining to claim 36 further including singulating the 300 mm semiconductor wafer using a 200 mm semiconductor wafer saw chuck. Also, Tandy fails to show, pertaining to claim 37, further including holding the 300 mm semiconductor wafer in a 200 mm semiconductor wafer pick-and-

place machine chuck while removing the at least some singulated individual components therefrom. Tandy fails to show, pertaining to claim 38, a method of using 300 mm semiconductor wafer, including handling the 300 mm semiconductor wafer with equipment sized to handle 200 mm semiconductor wafers. Finally, Tandy fails to show, pertaining to claim 39, further including processing the 300 mm Semiconductor wafer with equipment sized to handle 200 mm semiconductor wafers.

Oka teaches, in figures 1A-7H, and corresponding text, a similar method where conventionally the semiconductor wafers are grinded to a desired thickness of 300 mm prior to singulation (col. 1, lines 19-66; col. 2, lines 9-15).

It would have been obvious to one of ordinary skill in the art to incorporate the following steps of: wherein the semiconductor wafer is a 300 mm semiconductor wafer and further including handling the 300 mm semiconductor wafer using equipment sized to handle 200 mm semiconductor wafers; further including singulating the 300 mm semiconductor wafer using a 200 mm semiconductor wafer saw chuck; further including holding the 300 mm semiconductor wafer in a 200 mm semiconductor wafer pick-and-place machine chuck while removing the at least some singulated individual components therefrom; a method of using 300 mm semiconductor wafer, including handling the 300 mm semiconductor wafer with equipment sized to handle 200 mm semiconductor wafers; further including processing the 300 mm Semiconductor wafer with equipment sized to handle 200 mm semiconductor wafers, in the method of Tandy, pertaining to claims 35-39, according to the teachings of Oka, with the motivation that with the motivation of conventionally preparing the semiconductor wafer for further packaging processing techniques such as chip formation. In addition, since the

semiconductor wafer size is 300 mm the advantage would be greater production in the number of chips produced, resulting in an improvement of throughput chip manufacturing. Finally, since Oka teaches, that the semiconductor wafers are conventionally formed at a size of 300 mm, having equipment to accommodate handling a wafer of this size is obviously well known in the art of semiconductor manufacturing.

Response to Arguments

14. Applicant's arguments filed 11/03/08 have been fully considered but they are not persuasive. In the Remarks on pages 7-13:

15. Applicant raises the clear issue as to whether Tandy alone or in combination with Kurosawa and/or Oka, suggests, gripping the semiconductor wafer along at least a portion of a continuous peripheral ring of material comprising at least in part semiconductor material. (arguments regarding singulating the semiconductor wafer from a backside thereof after backgrinding and selecting a 300 mm wafer, and handling the 300 mm semiconductor wafer using equipment sized to handle 200 mm semiconductor wafers, are moot, due to new grounds of rejection of newly amended claims 1 and 25).

16. The Examiner takes the position that Tandy alone and/or in combination with Kurosawa and/or Oka, does suggest the above statements and limitations. Specifically, Tandy teaches a semiconductor wafer **10** having a major active surface **23** having initial unsingulated semiconductor dies **20** (figures 1A-2; [0028-0029]), where the ring of semiconductor material is the portions between the unsingulated semiconductor dies and outer edge of the wafer. In addition, Tandy teaches that the backside **12** of the wafer is grinded and a flexible marking tape

is mounted to the active surface of the semiconductor wafer on the backside of the grinded semiconductor wafer.

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STANETTA D. ISAAC whose telephone number is (571)272-1671. The examiner can normally be reached on Monday-Friday 9:30am -6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Garber can be reached on 571-272-2194. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Stanetta Isaac
Patent Examiner
February 16, 2009

/Charles D. Garber/
Supervisory Patent Examiner, Art Unit 2812